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EPIDEMIC POLIOMYELITIS: ITS NATURE AND MODE OF INFECTION.[1]

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The present time, while we are under the influence of the serious epidemic of the past summer and autumn, may be the most favorable time to impress certain essential facts regarding poliomyelitis upon the general medical profession.

Epidemic poliomyelitis, or infantile paralysis as the disease is variously and on the whole erroneously called, is becoming increasingly familiar to us. Indeed, each year since 1906 the disease has prevailed in some part of this country in severe or even epidemic form. It is, of course, true that epidemics had occurred in this country before, but their relatively small size and their infrequency marked them off sharply from the epidemics prevailing since 1906. The recent experience America has been passing through is, however, not exceptional, since during the same period the disease has become more prevalent throughout the world—affecting the European countries, the West Indies, South America, the far East, Australia, etc. This very wide and general distribution of the disease can be attributed to the endemic foci in northern Europe, ever becoming more and more active, which culminated in the severe epidemic

[1] Part of the discussion on Poliomyelitis held at the College of Physicians of Philadelphia, December 6, 1916.

outbreak in Sweden of 1905. It was the epidemic of 1905 which was the immediate forerunner of the pandemical occurrences mentioned.

Unfortunately, very considerable uncertainty exists still regarding the character and nature of this epidemic disease. Because of its recent introduction into this country a large part of the medical profession has lacked familiarity with it. On the surface it is not so easy to identify the severe forms of the epidemic disease with the occasional and sporadic instance of infantile paralysis arising in every considerable community, and yet essentially they are one and the same disease—that is, they are due to a common etiological agent, in the same manner as the sporadic instances and epidemics of cerebrospinal meningitis are both caused by the meningococcus.

Considerable difficulty and confusion have been introduced into the subject by the common names for the epidemic disease. As is usual, names express conceptions, and in this case the names chance to be misapplied. So long as the disease is conceived of as one attended by paralysis, which in turn is due to lesions of the gray matter of the spinal cord (or brain), a large number of cases are excluded altogether. Because we have now learned, thanks especially to Wickman, who studied the Swedish epidemic of 1905, that many cases of the disease, perhaps the majority, in epidemic times are not associated with any paralysis whatever. I shall not elaborate this point; I introduce it merely to emphasize its importance in respect to the public health control of the disease. Others who follow will doubtless refer to this same point. But I wish to leave you under no doubt that the disease we are considering appears in a variety of clinical forms, some of which are very slight and trifling and others of the profoundest severity.

If I should be called on to define epidemic poliomyelitis—so-called—I should call it an acute infectious and communicable disease, attended sometimes, but by no means always, with involvement of the central nervous organs, as a result of which incident paralysis often results. The parts of the central nervous organs most frequently involved are the meninges, with which may be and often is associated injury to the gray matter of the spinal cord and brain leading to muscular paralysis.

In its essential nature the disease is an infection. We now know, thanks especially to the employment of monkeys for inoculation, that the microörganism causing it is very minute, filterable, indeed, but probably not invisible. That is, by particular cultivation methods a minute anaërobic microörganism has been secured which fulfils Koch's law of causation. But I feel that it is better to wait until this experimental work has been confirmed in other countries in which epidemic poliomyelitis occurs before proclaiming the microorganism as the established cause of the disease.

But what is of first importance is the discovery of the manner in which the microbic cause of poliomyelitis enters and leaves the body,

because the mode of infection so largely controls the methods of prevention to be taken.

Tests carried out on monkeys have proved beyond doubt that the virus of poliomyelitis, so-called, exists regularly upon the mucous surfaces of the nose and throat and often of the intestine, with the discharges of which it may gain access to external nature. It has also been traced on the upper respiratory mucous membrane of healthy persons who may act as carriers, and has been found in several instances in the tonsils removed by operation several months after recovery from the acute disease, so that the existence of so-called chronic carriers has also been indicated.

In spite of doubts and disputes concerning the mode of infection, this much we know positively, and hence should take sanitary measures accordingly: the infectious agent can and does enter and leave the body by the upper respiratory mucous membrane, and may at least leave the body with the intestinal discharges. Whether there are still other avenues of infection we do not know. Neither do we yet understand the tendency of the disease to reach its height in the late summer and early autumn months. But in attempting to interpret that phenomenon we must still keep in mind that increasing intensive study is showing more and more that cases of the disease extend throughout the winter, and in two instances at least midwinter epidemics occurred in Sweden and Norway.

Under the circumstances the disease is to be regarded as communicable from person to person—by the infected sick in any of the many forms in which it appears and by healthy persons who may be contaminated by the sick. It is, of course, not possible to control by isolation all exposed persons. But a large part of the problem of the public control of the disease rests on early and accurate diagnosis, and the reduction of exposure of persons who may become potential healthy carriers of the agent of infection.

What is greatly to be desired is a simple, readily applied biological test which would give practically unmistakable answer as to whether poliomyelities was present or not. Such a test has not yet been devised. We cannot use the cultures for this purpose because they are too difficult to obtain; we can, however, use lumbar puncture, which in 90 per cent. or more of instances yields a definite result. In general, it may be stated that, irrespective of the severity of the symptoms, lumbar puncture yields in cases of poliomyelitis a fluid, usually clear, but showing either morphological or chemical changes, or both these changes simultaneously. The mononuclear cells tend to be increased and globulin often is present. These changes in the cerebrospinal fluid, especially during periods of epidemic, should be regarded as presumptive evidences of poliomyelitic infection and measures of public protection taken accordingly. Moreover, as beginnings are being made in respect to a specific form of treatment, the employment of lumbar puncture and study of the

changes in the cerebrospinal fluid are affording the basis for the application of treatment at the more favorable periods, before contingent paralysis has appeared, which may often determine whether the treatment will be effective or not.

I must ask your indulgence for presenting a paper merely in outline. If the points presented impress you at times as being perhaps aphoristic, may I remind you that there exists competent, as I believe, clinical and experimental data for them all.

SOME PRACTICAL CONSIDERATIONS IN THE ADMINISTRATIVE CONTROL OF EPIDEMIC POLIOMYELITIS.[1]

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There are obvious practical limitations to the application of scientific laboratory and clinical knowledge in the public control of communicable disease. Furthermore, when the means of transmission, of immunization, and of detection of carriers of a disease are lacking the resources of the public health officer are sadly restricted. In view of the keen public and professional interest in the recent severe epidemic of poliomyelitis and the advantages which should accrue from a frank admission of the accepted facts, I venture to present the following statement of the situation as it must face professional advisers of public policies, so far as this particular disease is concerned.

The use of popular educational publicity will go far to teach parents the necessity of obtaining competent medical advice immediately upon the appearance of fever, pain, digestive disturbance, or acute symptoms of any kind in little children. Such advice is applicable at all times, but is listened to with respect only when the public is interested or is aroused to a particular danger. The benefit of following such advice is seen at once in the earlier home recognition of the common infections of childhood, a quicker appeal to the family physician, and in the more prompt and general reporting of communicable diseases of children to the health authorities. To the adoption of such advice we may attribute the decided reduction of the infectious diseases (pertussis, measles, diphtheria, scarlet fever, and infantile diarrhea) during the past summer.

The health officer can, with propriety, warn parents against allowing the indiscriminate association of children, and particularly against contact with children in whose families there are acute

[1] Read before the College of Physicians of Philadelphia, December 6, 1916.